FILE 'REGISTRY' ENTERED AT 10:16:00 ON 26 MAY 2004

=> S POLYESTERASE/CN
L1 0 POLYESTERASE/CN

=> S ESTERASE/CN
L2 2 ESTERASE/CN

=> D 1-2

L2 ANSWER 1 OF 2 REGISTRY COPYRIGHT 2004 ACS on STN
RN 9016-18-6 REGISTRY
CN Esterase, carboxyl (8CI, 9CI) (CA INDEX NAME)
OTHER NAMES:
CN α-Carboxylesterase
CN α-Esterase
CN β-Esterase
CN 1,4-Butanediol diacrylate esterase
CN 7-Amino-3-methoxy-3-cephem-4-carboxyl ester hydrolase
CN Aliesterase
CN Aminoacyl esterase
CN B-Esterase
CN Butyrate esterase
CN Butyryl esterase
CN Carbonic esterase
CN Carboxyesterase
CN Carboxyl ester hydrolase
CN Carboxyl ester lipase
CN Carboxyl esterase
CN Carboxylate esterase
CN Carboxylesterase B
CN Carboxylesterase ES-1
CN Carboxylic acid esterase
CN Carboxylic ester hydrolase
CN Carboxylic esterase
CN Chirazyme E 1
CN Chirazyme E-2
CN Chirazyme E-3
CN Cinnamate esterase
CN Cinnamic acid esterase
CN Cinnamoyl ester hydrolase
CN Cinnamoyl esterase
CN E.C. 3.1.1.1
CN E.C. 3.1.1.12
CN Egasyn
CN **Esterase**
CN Esterase 29
CN Esterase EP10
CN Esterase, B-
CN Fatty acid ethyl ester hydrolase
CN Fluazifop-butyl esterase
CN Ketoprofen alkyl esterase
CN Ketoprofen choline esterase
CN Methyl farnesoate esterase
CN Methylbutyrase
CN Methylbutyrate esterase
CN Monobutyrase
CN Naproxen esterase
CN Neutral esterase

CN Nonspecific carboxylesterase
CN Paraben esterase
CN Phthalate ester hydrolase
CN Phthalate esterase
CN Procaine esterase
ADDITIONAL NAMES NOT AVAILABLE IN THIS FORMAT - Use FCN, FIDE, or ALL for DISPLAY
DR 9025-97-2, 9027-84-3, 114514-18-0, 139074-54-7
MF Unspecified
CI MAN
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CABA, CAPLUS, CASREACT, CEN, CHEMCATS, CHEMINFORMRX, CHEMLIST, CIN, CSCHEM, CSNB, EMBASE, IFICDB, IFIPAT, IFIUDB, MSDS-OHS, PIRA, PROMT, TOXCENTER, USPAT2, USPATFULL
Other Sources: EINECS**, TSCA**
(**Enter CHEMLIST File for up-to-date regulatory information)
DT.CA CAplus document type: Conference; Dissertation; Journal; Patent; Report
RL.P Roles from patents: ANST (Analytical study); BIOL (Biological study); MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses)
RLD.P Roles for non-specific derivatives from patents: ANST (Analytical study); BIOL (Biological study); PREP (Preparation); PROC (Process); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: ANST (Analytical study); BIOL (Biological study); FORM (Formation, nonpreparative); MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)
RLD.NP Roles for non-specific derivatives from non-patents: ANST (Analytical study); BIOL (Biological study); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
3946 REFERENCES IN FILE CA (1907 TO DATE)
43 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
3951 REFERENCES IN FILE CAPLUS (1907 TO DATE)

L2 ANSWER 2 OF 2 REGISTRY COPYRIGHT 2004 ACS on STN
RN 9013-79-0 REGISTRY
CN **Esterase (9CI)** (CA INDEX NAME)
OTHER NAMES:
CN Ester hydrolase
CN Esterase ES46.5K
CN Nonspecific esterase
DR 9035-77-2
MF Unspecified
CI COM, MAN
LC STN Files: ADISNEWS, AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA, CAPLUS, CASREACT, CBNB, CEN, CIN, CSCHEM, CSNB, EMBASE, IFICDB, IFIPAT, IFIUDB, IPA, NAPRALERT, PIRA, PROMT, TOXCENTER, ULIDAT, USPAT2, USPATFULL
DT.CA CAplus document type: Book; Conference; Dissertation; Journal; Patent; Report
RL.P Roles from patents: ANST (Analytical study); BIOL (Biological study); CMBI (Combinatorial study); FORM (Formation, nonpreparative); MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)
RLD.P Roles for non-specific derivatives from patents: ANST (Analytical study); BIOL (Biological study); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses)

RL.NP Roles from non-patents: ANST (Analytical study); BIOL (Biological study); FORM (Formation, nonpreparative); MSC (Miscellaneous); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)
RLD.NP Roles for non-specific derivatives from non-patents: ANST (Analytical study); BIOL (Biological study); FORM (Formation, nonpreparative); OCCU (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
12708 REFERENCES IN FILE CA (1907 TO DATE)
117 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
12716 REFERENCES IN FILE CAPLUS (1907 TO DATE)

FILE 'CAPLUS' ENTERED AT 10:16:34 ON 26 MAY 2004

=> S ESTERASE
29221 ESTERASE
10795 ESTERASES
L3 33665 ESTERASE
(ESTERASE OR ESTERASES)

=> S L3,L2;S POLYESTERASE;S ?POLYESTER?;S THERMOMONOSPORA
16298 L2
L4 35512 (L3 OR L2)

6 POLYESTERASE
2 POLYESTERASES
L5 7 POLYESTERASE
(POLYESTERASE OR POLYESTERASES)

L6 294630 ?POLYESTER?

387 THERMOMONOSPORA
1 THERMOMONOSPORAS
L7 388 THERMOMONOSPORA
(THERMOMONOSPORA OR THERMOMONOSPORAS)

=> D L5 1-5 CBIB ABS

L5 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
2003:737867 Document No. 139:256231 Methods for generating cutinase variants with improved stability and **polyesterase** activity using high throughput site-saturation mutagenesis. Bott, Richard R.; Kellis, James T., Jr.; Morrison, Thomas B. (Genencor International, Inc., USA). PCT Int. Appl. WO 2003076580 A2 20030918, 55 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2003-US6908 20030305. PRIORITY: US 2002-91912 20020305; US 2002-92227 20020305; US 2002-PV362372 20020305; US 2002-PV403921 20020815.

AB The present invention provides mutagenesis methods for protein engineering. In particular, the present invention provides mutagenesis methods that include feedback adjustment from systematic result evaluation. More specifically, the invention provides site-saturation mutagenesis methods that screen for variants with one or more desirable protein properties and evaluates screening results to provide feedback for repeat screening and construction of new libraries. The invention further provides cutinase variants of Pseudomonase mendocina that provide improved stability and **polyesterase** activity compared with the wild type cutinase.

L5 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
2002:524522 Document No. 138:5528 Enzymatic modification of polyester. Yoon, Mee-Young; Kellis, Jim; Poulose, A. J. (Genencor International Inc., Palo Alto, CA, USA). AATCC Review, 2(6), 33-36 (English) 2002. CODEN: ARAEBW. ISSN: 1532-8813. Publisher: American Association of Textile Chemists and Colorists.

AB Improvement of polyester fabric properties using a novel technol. involving enzymic surface modification of the polyester was investigated. The enzyme, **polyesterase**, is a serine esterase that acts by cleaving the polymer chain through hydrolysis of the ester bonds and releasing soluble fragments of the polymer. Using **polyesterase**, enzymic improvement of many undesirable properties of the polyester under mild conditions was demonstrated. The enzyme treatment resulted in depilling, enhanced hydrophilicity, increased cationic dye binding, removal of polyester size, decreased fiber luster, and improved oily stain release.

L5 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
2001:480571 Document No. 135:78200 Enzymatic modification of the surface of a polyester fiber or article. Kellis, James T., Jr.; Poulose, Ayrookaran J.; Yoon, Mee-Young (Genencor International, Inc., USA). U.S. US 6254645 B1 20010703, 12 pp., Cont.-in-part of U.S. Ser. No. 378,087, abandoned. (English). CODEN: USXXAM. APPLICATION: US 1999-435083 19991105. PRIORITY: US 1999-378087 19990820.

AB A method is provided for improving the uptake of a cationic compound onto a polyester article starting material, comprising the steps of: (a) obtaining a **polyesterase** enzyme; (b) contacting the **polyesterase** enzyme with the polyester article starting material under conditions and for a time suitable for the **polyesterase** to produce surface modification of the polyester article starting material and produce a surface modified polyester; (c) contacting the modified polyester article, subsequently or simultaneously with said step (b) with a cationic compound whereby adherence of said cationic compound to the modified polyester is increased compared to said polyester starting material. Also disclosed is a method for increasing the hydrophilicity of a polyester to improve fabric characteristics such as stain resistance, wettability and/or dyeability.

L5 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
2001:360246 Document No. 134:368228 Enzymes useful for changing the properties of polyester fibers. Dyson, Wade; Kellis, James T., Jr.; Poulose, Ayrookaran J.; Yoon, Mee-Young (Genencor International, Inc., USA). PCT Int. Appl. WO 2001034899 A1 20010517, 32 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ, DE, DE, DK, DK, DM, EE, EE, ES, FI, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM,

CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 2000-US27917 20001010. PRIORITY: US 1999-435461 19991105.

AB A method is provided for enzymically modifying a polyester resin, film, fiber, yarn, fabric or textile with a **polyesterase** to modify the characteristics thereof.

L5 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

2001:223485 Document No. 134:364046 Polyesters in higher plants. Kolattukudy, Pappachan E. (The Ohio State University, Columbus, OH, 43210, USA). Advances in Biochemical Engineering/Biotechnology, 71(Biopolyesters), 1-49 (English) 2001. CODEN: ABEBDZ. ISSN: 0724-6145. Publisher: Springer-Verlag.

AB A review with 188 refs. Polyesters occur in higher plants as the structural component of the cuticle that covers the aerial parts of plants. This insol. polymer, called cutin, attached to the epidermal cell walls is composed of interesterified hydroxy and hydroxy epoxy fatty acids. The most common chief monomers are 10,16-dihydroxy C16 acid, 18-hydroxy-9,10 epoxy C18 acid, and 9,10,18-trihydroxy C18 acid. These monomers are produced in the epidermal cells by ω hydroxylation, in-chain hydroxylation, epoxidn. catalyzed by P450-type mixed function oxidase, and epoxide hydration. The monomer acyl groups are transferred to hydroxyl groups in the growing polymer at the extracellular location. The other type of polyester found in the plants is suberin, a polymeric material deposited in the cell walls of a layer or two of cells when a plant needs to erect a barrier as a result of phys. or biol. stress from the environment, or during development. Suberin is composed of aromatic domains derived from cinnamic acid, and aliphatic polyester domains derived from C16 and C18 cellular fatty acids and their elongation products. The polyesters can be hydrolyzed by pancreatic lipase and cutinase, a **polyesterase** produced by bacteria and fungi. Catalysis by cutinase involves the active serine catalytic triad. The major function of the polyester in plants is as a protective barrier against phys., chemical, and biol. factors in the environment, including pathogens. Transcriptional regulation of cutinase gene in fungal pathogens is being elucidated at a mol. level. The polyesters present in agricultural waste may be used to produce high value polymers, and genetic engineering might be used to produce large quantities of such polymers in plants.

=> S L7 AND L4
L8 7 L7 AND L4

=> S L8 NOT L5
L9 7 L8 NOT L5

=> D 1-7 CBIB ABS

L9 ANSWER 1 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

2003:818066 Document No. 139:318417 **Thermomonospora** fusca DNA sequences coding for ester-group-cleaving enzymes. Deckwer, Wolf-Dieter; Mueller, Rolf-Joachim; Van den Heuvel, Joop; Kleeberg, Ilona; Widow, Ute (Germany). U.S. Pat. Appl. Publ. US 2003194790 A1 20031016, 16 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-102239 20020320.

AB The invention relates to DNA sequences coding for enzymes that cleave or hydrolyze ester groups, to the production of those enzymes by genetically recombinant microorganisms and to the use of those enzymes and microorganisms for the degradation of polymers containing ester groups, especially aliphatic-aromatic polyesters. Thus, the ester-group-cleaving enzymes (EGCE) regulon was identified and cloned from a genomic DNA library of **Thermomonospora** fusca strain DSM 47393.

L9 ANSWER 2 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

2002:638426 Document No. 137:324255 Production of a Polyester Degrading Extracellular Hydrolase from **Thermomonospora** fusca. Gouda, Mona K.; Kleeberg, Ilona; Van den Heuvel, Joop; Mueller, Rolf-Joachim; Deckwer, Wolf-Dieter (University of Alexandria, Alexandria, Egypt). Biotechnology Progress, 18(5), 927-934 (English) 2002. CODEN: BIPRET. ISSN: 8756-7938. Publisher: American Chemical Society.

AB The production of a polyester-degrading hydrolase from the thermophilic actinomycete **Thermomonospora** fusca was investigated with regard to its potential tech. application. Only in the presence of a polyester (random aliphatic-aromatic copolyester from 1,4-butanediol, terephthalic acid, and adipic acid with around 40-50 mol % terephthalic acid in the acid component), the excretion of the extracellular enzyme could be achieved with an optimized synthetic medium using pectin and NH4Cl as nitrogen source. Compared to complex media, a significantly higher specific activity at comparable volumetric yields could be obtained, thus reducing the expenditure for purification The activity profile in the medium is controlled by a complex process involving (1) induction of enzyme excretion, (2) enzyme adsorption on the hydrophobic polyester surface, (3) inhibition of enzyme generation by monomers produced by polyester cleavage, and (4) enzyme denaturation. Diafiltration with cellulose acetate membranes as the sole downstream processing step led to a product of high purity and with sufficient yield (60% of total activity). Scaling-up from shaking flasks to a fermentor scale of 100 L revealed no specific problems. However, the excretion of the hydrolase by the actinomycete turned out to be inhibited by the degradation products (monomers) of the aliphatic-aromatic copolyester used as inductor for the enzyme production The crude enzyme exhibited generally similar properties (temperature and pH optimum) as the highly purified hydrolase described previously; however, the storage capability and thermal stability is improved when the crude enzyme solution is diafiltrated.

L9 ANSWER 3 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

2001:247512 Document No. 134:277401 Ester-cleaving enzyme of **Thermomonospora** fusca and its use in degradation of polyesters. Deckwer, Wolf-Dieter; Mueller, Rolf-Joachim; Kleeberg, Ilona; Van Den Heuvel, Joop (Gesellschaft Fuer Biotechnologische Forschung Mbh (Gbf), Germany). PCT Int. Appl. WO 2001023581 A1 20010405, 37 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (German). CODEN: PIXXD2. APPLICATION: WO 2000-EP7115 20000725. PRIORITY: DE 1999-19947286 19990930.

AB The invention relates to an enzyme which cleaves ester groups and which can be obtained by cultivating the microorganism **Thermomonospora** fusca in an appropriate nutrient medium, optionally in the presence of an inductor. The enzyme may be used in degradation of polyesters and polyester-containing polymers. Thus, the ester-cleaving enzyme of T. fusca was isolated and sequenced. The enzyme has a mol. weight of 27,400 (SDS gel electrophoresis), a temperature optimum of 65°, a pH optimum of 6-7, and a pI of 6.4. It cleaves ester-containing polymers, triglycerides, and phthalate esters.

L9 ANSWER 4 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

1995:460720 Document No. 122:209551 Effects of the detergent Tween 80 on **Thermomonospora** curvata. Thies, E.; Jenkins, T.; Stutzenberger, F. (Department Animal, Dairy and Veterinary Sciences, Clemson University, Clemson, SC, 29634-1909, USA). World Journal of Microbiology & Biotechnology, 10(6), 657-63 (English) 1994. CODEN: WJMBEY. ISSN: 0959-3993.

AB Tween 80 (0.1%, volume/volume) added to **Thermomonospora** curvata growing in minimal medium caused a transient lowering of the dry cell mass, decreased the optimal growth temperature of the thermophile from 62 to 54°C, and increased extracellular **esterase** activity. Cells grown in the presence of Tween 80 had decreased concns. of branched chain fatty acids and increased concns. of oleic acid. The detergent removed surface protuberances from mycelia and increased the liberation of enzymes active against crystalline cellulose, but did not stimulate liberation of enzymes active against CM-cellulose, starch or pectin.

L9 ANSWER 5 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

1993:163839 Document No. 118:163839 Xylan-degrading enzymes produced by the thermophilic actinomycete **Thermomonospora** fusca. McCarthy, A. J.; Bachmann, S. L. (Dep. Genet. Microbiol., Univ. Liverpool, Liverpool, L69 3BX, UK). Progress in Biotechnology, 7(Xylans Xylanases), 309-13 (English) 1992. CODEN: PBITE3. ISSN: 0921-0423.

AB The thermophilic actinomycete T. fusca produces an inducible xylan-degrading enzyme system, the major components of which are multiple endoxylanases. Their purification and properties are described along with those of the single cell-associated β-xylosidase, single extracellular α-arabinofuranosidase and multiple acetyl **esterases**. The endoxylanase and β-xylosidase activities exhibited relatively good thermostability properties, and the latter enhanced the saccharification of xylan by relieving end-product inhibition on endoxylanase. Purified α-arabinofuranosidase and endoxylanase cooperated in the saccharification of wheat straw but did not interact to enhance the degradation of a com. xylan preparation All of the purified enzymes were very specific, and there was no cross-reaction between endoxylanases and endoglucanases. Both the intracellular and extracellular acetyl **esterases** released acetic acid from acetyl xylan.

L9 ANSWER 6 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN

1991:530464 Document No. 115:130464 Purification and cooperative activity of enzymes constituting the xylan-degrading system of **Thermomonospora** fusca. Bachmann, Susan L.; McCarthy, Alan J. (Dep. Genet. Microbiol., Univ. Liverpool, Liverpool, L69 3BX, UK). Applied and Environmental Microbiology, 57(8), 2121-30 (English) 1991. CODEN: AEMIDF. ISSN: 0099-2240.

AB The thermophilic actinomycete, T. fusca, produced endoxylanase, α-arabinofuranosidase, β-xylosidase, and acetyl **esterase** activities maximally during growth on xylan. Growth yields on glucose, xylose, or arabinose were comparable, but production of endoxylanase and β-xylosidase was not induced on these substrates. The crude xylanase activity was thermostable and relatively resistant to end-product inhibition by xylobiose and xylan hydrolysis products. Six proteins with xylanase activity were identified by zymogram anal. of isoelec. focusing gels, but only a 23-kDa protein exhibiting 3 isomeric forms could be purified by fast-protein liquid chromatog. Endoglucanases were also identified in CM-cellulose-grown cultures, and their distinction from endoxylanases was confirmed. α-Arabinofuranosidase activity was due to a single dimeric protein of 92 kDa, which was particularly resistant to end-product inhibition by arabinose. Three bands of acetyl **esterase** activity were detected by zymogram anal., and there was evidence that these mainly consisted of an intracellular 80-kDa protein secreted to yield

active 40-kDa subunits in the culture supernatant. The acetyl **esterases** were found to be responsible for acetyl xylan **esterase** activity in T. fusca, in contrast to the distinction proposed in some other systems. The addition of purified β-xylosidase to endoxylanase increased the hydrolysis of xylan, probably by relieving end-product inhibition. The enhanced saccharification of wheat straw caused by the addition of purified α-arabinofuranosidase to T. fusca endoxylanase suggested a truly synergistic relation, in agreement with proposals that arabinose side-groups on the xylan chain participate in crosslinking within the plant cell wall structure.

L9 ANSWER 7 OF 7 CAPLUS COPYRIGHT 2004 ACS on STN
1983:140172 Document No. 98:140172 Enzymatic profiles of selected thermophilic actinomycetes. Hollick, Gary E. (Sch. Med. Dent., Univ. Rochester, Rochester, NY, 14642, USA). Microbios, 35(141-142), 187-96 (English) 1982. CODEN: MCBIA7. ISSN: 0026-2633.
AB To examine more fully the enzymic capabilities of thermophilic actinomycetes, API ZYM strips were used to assay 19 different enzymes. Culture supernatant fractions obtained from 13 isolates of Thermoactinomyces candidus, 10 isolates T. vulgaris, 2 isolates of T. sacchari, 7 isolates of Micropolyspora faeni 4 isolates of Saccharomonospora viridis, and 4 isolates of **Thermomonospora** fusca were assayed. Whole cells from selected isolates were also assayed. Alkaline and acid phosphatase, C4 **esterase**, and C8 **esterase** -lipase activities were demonstrated for both whole cells and supernatant of T. candidus. M. faeni Whole cells and supernatant contained alkaline and acid phosphatase, phosphoamidase, C4 and C8 **esterase**-lipase, and leucine and cystine aminopeptidase activities. Whole cells of T. vulgaris displayed C4 **esterase**, leucine aminopeptidase, chymotrypsin, and α-glucosidase activities, whereas supernatant contained only phosphoamidase and α-glucosidase activity. Culture supernatants fractions of T. sacchari showed alkaline phosphatase and C4 and C8 **esterase**-lipase activities. T. fusca Supernatant fractions contained C4 and C8 **esterase**-lipase activities, leucine aminopeptidase, β-galactosidase, and α-glucosidase activities. S. viridis Had alkaline phosphatase, C4 and C8 **esterase**-lipase, C14 lipase, leucine aminopeptidase, α-glucosidase, and N-acetyl-β-glucosaminidase activities. The differences in enzymic profiles for these actinomycetes allowed clear differentiation among genera and species.

=> S L7(6A)L6
L10 6 L7(6A)L6

=> S L10 NOT (L5,L8)
L11 2 L10 NOT ((L5 OR L8))

=> D 1-2 CBIB ABS

L11 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
2004:222452 Alteration in the global protein expression of **Thermomonospora** fusca resulting from the adaptation to **copolyester** plastics. Weigand, Michael R.; Fisher, Matthew A. (Department of Chemistry, Saint Vincent College, Latrobe, PA, 15650, USA). Abstracts of Papers, 227th ACS National Meeting, Anaheim, CA, United States, March 28-April 1, 2004, CHED-132. American Chemical Society: Washington, D. C. (English) 2004. CODEN: 69FGKM.
AB The ability of soil native thermophilic bacteria like Thermomonospora fusca to adapt to and degrade synthetic polymers like copolyesters in addition to their natural energy sources is one potential solution to plastic waste accumulation. Bacteria are adaptive to their environments and to better understand the enzymes produced by T. fusca in the presence of synthetic polymers, we grew cultures on glucose, cellulose, and two different

copolyesters. Global protein expression of T. fusca was monitored by 2-D gel electrophoresis of cell exts. Changes in protein expression will be compared with work by others on the various enzymes involved in degradation of cellulose and synthetic polyesters.

L11 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
1998:271609 Document No. 129:50631 Biodegradation of aliphatic-aromatic **copolyesters** by **Thermomonospora** fusca and other thermophilic compost isolates. Kleeberg, Ilona; Hetz, Claudia; Kroppenstedt, Reiner Michael; Muller, Rolf-Joachim; Deckwer, Wolf-Dieter (Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, D-38124, Germany). Applied and Environmental Microbiology, 64(5), 1731-1735 (English) 1998. CODEN: AEMIDF. ISSN: 0099-2240. Publisher: American Society for Microbiology.

AB Random aliphatic-aromatic copolyesters synthesized from 1,4-butanediol, adipic acid, and terephthalic acid (BTA) have excellent thermal and mech. properties and are biodegradable by mixed cultures (e.g., in compost). Over 20 BTA-degrading strains were isolated by using compost as a microbial source. Among these microorganisms, thermophilic actinomycetes obviously play an outstanding role and appear to dominate the initial degradation step. Two actinomycete strains exhibited about 20-fold higher BTA degradation rates than usually observed in a common compost test. These isolates were identified as Thermomonospora fusca strains. They appeared to be particularly suitable for establishment of rapid degradation tests and were used in comparative studies on the biodegrdn. of various polyesters.

=> S L7(12A)L6
L12 8 L7(12A)L6

=> S L12 NOT L10
L13 2 L12 NOT L10

=> D 1-2 CBIB ABS

L13 ANSWER 1 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
2001:480571 Document No. 135:78200 Enzymatic modification of the surface of a polyester fiber or article. Kellis, James T., Jr.; Poulose, Ayrookaran J.; Yoon, Mee-Young (Genencor International, Inc., USA). U.S. US 6254645 B1 20010703, 12 pp., Cont.-in-part of U.S. Ser. No. 378,087, abandoned. (English). CODEN: USXXAM. APPLICATION: US 1999-435083 19991105. PRIORITY: US 1999-378087 19990820.

AB A method is provided for improving the uptake of a cationic compound onto a polyester article starting material, comprising the steps of: (a) obtaining a polyesterase enzyme; (b) contacting the polyesterase enzyme with the polyester article starting material under conditions and for a time suitable for the polyesterase to produce surface modification of the polyester article starting material and produce a surface modified polyester; (c) contacting the modified polyester article, subsequently or simultaneously with said step (b) with a cationic compound whereby adherence of said cationic compound to the modified polyester is increased compared to said polyester starting material. Also disclosed is a method for increasing the hydrophilicity of a polyester to improve fabric characteristics such as stain resistance, wettability and/or dyeability.

L13 ANSWER 2 OF 2 CAPLUS COPYRIGHT 2004 ACS on STN
1999:284537 Document No. 131:113492 Production of cutinase by Thermomonospora fusca ATCC 27730. Fett, W. F.; Wijey, C.; Moreau, R. A.;

Osman, S. F. (ARS, Eastern Regional Research Center, Plant Science & Technology Research Unit, USDA, Wyndmoor, PA, 19038, USA). Journal of Applied Microbiology, 86(4), 561-568 (English) 1999. CODEN: JAMIFK. ISSN: 1364-5072. Publisher: Blackwell Science Ltd..

AB Ten strains belonging to various **Thermomonospora** species were tested for their ability to hydrolyze the insol. plant **polyester** cutin. One strain, the thermophile T. fusca ATCC 27730, was found to produce a highly inducible cutinase when grown in broth medium containing purified apple cv. Golden Delicious cutin. Apple pomace, tomato peel, potato suberin and com. cork were also shown to induce cutinase production Addition of glucose to the culture medium either at the beginning of fermentation or after 2 days of incubation in the presence of apple cutin led to repression of cutinase production The cutinase was active against a wide range of cutins, including those isolated from other apple cultivars as well as tomato, cucumber, grapefruit, and green pepper. Cutinase activity in the induced culture supernatant fluids exhibited a half-life of over 60 min at 70°C and a pH optimum of 11.0. Some potential applications for cutinases are discussed.

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=> S L7(L)L6
L14           9 L7(L)L6

=> S L14 NOT L12
L15           1 L14 NOT L12

=> D CBIB ABS
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L15 ANSWER 1 OF 1 CAPLUS COPYRIGHT 2004 ACS on STN

2001:409215 Document No. 135:231081 Biodegradation of aliphatic-aromatic copolyesters: evaluation of the final biodegradability and ecotoxicological impact of degradation intermediates. Witt, U.; Einig, T.; Yamamoto, M.; Kleeberg, I.; Deckwer, W.-D.; Muller, R.-J. (BASF AG, Polymer Laboratory, Ludwigshafen, D-67056, Germany). Chemosphere, 44(2), 289-299 (English) 2001. CODEN: CMSHAF. ISSN: 0045-6535. Publisher: Elsevier Science Ltd..

AB The biol. degradation behavior of the aliphatic-aromatic **copolyester** Ecoflex® was investigated with regard to the degree of degradation and the intermediates formed during the degradation process. The individual thermophilic strain **Thermomonospora** fusca, isolated from compost material, was used for the degradation expts. in a defined synthetic medium at 55°. After 22 days of degradation more than 99.9% of the polymer had depolymd. and with regard to the degradation of the diacid and diol components of Ecoflex® only the monomers of the **copolyesters** (1,4-butanediol, terephthalate and adipate) could be detected by gas chromatog./mass spectroscopy (GC-MS) measurements in the medium. In interrupted degradation expts. predominantly the monoesters of adipic acid and terephthalic acid with 1,4-butanediol were observed in addition to the monomers. In toxicol. tests with Daphnia magna and Photobacterium phosphoreum no significant toxicol. effect was observed, neither for the monomeric intermediates nor for the oligomeric intermediates. From a risk assessment it can be concluded that there is no indication for an environmental risk when aliphatic-aromatic **copolyesters** of the Ecoflex-type are introduced into composting processes.

```
=> E DECKWER W/AU
=> S E3-E8
             3 "DECKWER W"/AU
           221 "DECKWER W D"/AU
             1 "DECKWER WOLF"/AU
            13 "DECKWER WOLF D"/AU
```

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           168 "DECKWER WOLF DIETER"/AU
             1 "DECKWER WOLFGANG DIETER"/AU
L16        407 ("DECKWER W"/AU OR "DECKWER W D"/AU OR "DECKWER WOLF"/AU OR
               "DECKWER WOLF D"/AU OR "DECKWER WOLF DIETER"/AU OR "DECKWER
               WOLFGANG DIETER"/AU)

=> E MUELLER R/AU
=> S E3,E14,E15,E173,E180
           777 "MUELLER R"/AU
            15 "MUELLER R J"/AU
             3 "MUELLER R J J"/AU
           269 "MUELLER ROLF"/AU
            22 "MUELLER ROLF JOACHIM"/AU
L17       1086 ("MUELLER R"/AU OR "MUELLER R J"/AU OR "MUELLER R J J"/AU OR
               "MUELLER ROLF"/AU OR "MUELLER ROLF JOACHIM"/AU)

=> E KLEEBERG I/AU
=> S E3,E4
             2 "KLEEBERG I"/AU
             7 "KLEEBERG ILONA"/AU
L18          9 ("KLEEBERG I"/AU OR "KLEEBERG ILONA"/AU)

=> E HEUVEL J/AU
=> S E3,E10-E13
             2 "HEUVEL J"/AU
             3 "HEUVEL JOOP"/AU
             1 "HEUVEL JOOP J"/AU
             3 "HEUVEL JOOP J T M"/AU
             1 "HEUVEL JOOP V D"/AU
L19         10 ("HEUVEL J"/AU OR "HEUVEL JOOP"/AU OR "HEUVEL JOOP J"/AU OR
               "HEUVEL JOOP J T M"/AU OR "HEUVEL JOOP V D"/AU)

=> S L16,L17,L18,L19
L20       1486 (L16 OR L17 OR L18 OR L19)

=> S L20 AND L6
L21         40 L20 AND L6

=> S L20 AND L7
L22          5 L20 AND L7

=> S L21,L22
L23         40 (L21 OR L22)

=> S L23 NOT (L5,L9,L14)
L24         35 L23 NOT ((L5 OR L9 OR L14))

=> D 1-35 TI

=> D 2-4,7,8,10,11,13-18,21-27,29 CBIB ABS

L24  ANSWER 2 OF 35  CAPLUS  COPYRIGHT 2004 ACS on STN
2003:313233  Document No. 139:209746  Studies on the enzymatic hydrolysis of
     polyesters. I. Low molecular mass model esters and aliphatic
     polyesters.  Marten, Elke; Muller, Rolf-Joachim; Deckwer,
     Wolf-Dieter (GBF-Gesellschaft fur Biotechnologische Forschung mbH,
     TU-BCE, Braunschweig, D-38124, Germany).  Polymer Degradation and
     Stability, 80(3), 485-501 (English) 2003.  CODEN: PDSTDW.  ISSN:
     0141-3910.  Publisher: Elsevier Science Ltd..
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AB The bio-catalyzed cleavage of ester bonds in low mol. mass model esters and aliphatic **polyesters** was studied in detail with the aim to gain improved information about the underlying mechanism and the parameters controlling **polyester** degradation Among various hydrolytic enzymes the lipase of Pseudomonas species (PsL) was chosen for the investigations. In the heterogeneous phase system the specific hydrolysis rate of the esters was constant as long as free substrate surface was available. In addition to aliphatic low mol. mass model esters, also cycloaliph. and aromatic esters were cleaved by PsL, indicating that a steric hindrance of the enzymic ester cleavage is not the predominant controlling factor in **polyester** degradation However, the cleavage rates of the aliphatic model esters are larger by more than an order of magnitude. For aliphatic **polyesters** the temperature difference between the m.p. of the polymer and the temperature where degradation takes place (ΔTmt), turned out to be the primary controlling parameter for **polyester** degradation with the lipase. Only if ΔTmt<30°, a measurable enzymic degradation rate is found. ΔTmt can be regarded as a measure of the mobility of the **polyesters** chains in the crystalline domains, necessary for the access of the esters to the active site of the lipase. Though aliphatic **homopolyesters** are seemingly very similar with regard to their chemical structure and reactivity of the ester bonds, their enzymic degradation rates still differ significantly even at the same ΔTmt. These differences have obviously to be attributed to small changes in the chemical structure, as, for instance, the C number of the aliphatic diacid.

L24 ANSWER 3 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

2003:60541 Document No. 139:117773 Structure-biodegradability relationship of **polyesters**. **Mueller, Rolf-Joachim**; Marten, Elke; **Deckwer, Wolf-Dieter** (Gesellschaft fuer Biotechnologische Forschung mbH, Braunschweig, D-38124, Germany). Biorelated Polymers: Sustainable Polymer Science and Technology, [Combined Proceedings of the International Conference on Biopolymer Technology], 1st, Coimbra, Portugal, Sept. 29-Oct. 1, 1999 and 2nd, Ischia (Naples), Italy, Oct. 25-27, 2000, 303-311. Editor(s): Chiellini, Emo. Kluwer Academic/Plenum Publishers: New York, N. Y. ISBN: 0-306-46652-X (English) 2001. CODEN: 69DLX6.

AB The biodegradability of polymers and also **polyesters** is solely determined by the structure and the morphol. of the plastics. To ensure environmental safety of products and to be able to design new tailor made biodegradable plastics, it is important to know the correlation of structure and biodegradability. Based on especially synthesized aliphatic **polyesters**, aromatic **polyesters**, aliphatic-aromatic **copolyesters** and low mol. weight oligo-esters, the degradation behavior was studied with a lipase from Pseudomonas sp. For aliphatic **polyesters** the difference between melting temperature of the polymer and the degradation temperature turned out to be predominantly determining the degradation The missing degradability of aromatic **polyesters** is obviously not caused by a steric hindrance of the polymer-enzyme complex but must be correlated with the high m.p. and also the low flexibility of the polymer chains. The degradability of aliphatic-aromatic **copolyesters** is not determined by the number of aliphatic ester bonds and the length of aliphatic sequences, but the length of aromatic domains. The length of these domains correlates with the melting temperature of the materials.

L24 ANSWER 4 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

2002:831983 Document No. 137:357523 Enzymic degradation of **polyester** nanoparticles. Welzel, Katharina; **Mueller, Rolf-Joachim**; **Deckwer, Wolf-Dieter** (Gesellschaft fuer Biotechnologische

Forschung mbH, Braunschweig, D-38124, Germany). Chemie Ingenieur Technik, 74(10), 1496-1500 (German) 2002. CODEN: CITEAH. ISSN: 0009-286X. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB A rapid and reliable test system for enzymic degradation processes was developed using **polyester** nanoparticles. With this aim, a laboratory test which gives well reproducible results with polymer films was adapted to nanoparticles. Lipases from Pseudomonas species and Candida cylindracea were used. The degradation rate of nanoparticles was dramatically increased in comparison to films owing to an other polymer structure of nanoparticles (amorphous and partially crystalline). Aliphatic **polyesters** were completely and rapidly degraded. In the case of aromatic **polyesters** a distinct degradation within several hours was observed A high degradation rate at the beginning and a clearly slower degradation in a 2nd stage is characteristic of aliphatic-aromatic **copolyesters**.

L24 ANSWER 7 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

2001:163884 Document No. 134:330967 Degradation of natural and synthetic **polyesters** under anaerobic conditions. Abou-Zeid, D.-M.; Muller, R.-J.; **Deckwer, W.-D.** (Biochemical Engineering Division, Gesellschaft fur Biotechnologische Forschung mbH, GBF, Braunschweig, D-38124, Germany). Journal of Biotechnology, 86(2), 113-126 (English) 2001. CODEN: JBITD4. ISSN: 0168-1656. Publisher: Elsevier Science Ltd..

AB Often, degradability under anaerobic conditions is desirable for plastics claimed to be biodegradable, e.g., in anaerobic biowaste treatment plants, landfills, and natural anaerobic sediments. The biodegrdn. of the natural **polyesters** poly(β-hydroxybutyrate) (PHB), poly(β-hydroxybutyrate-co-11.6%-β-hydroxyvalerate) (PHBV), and the synthetic **polyester** poly(.vepsiln.-caprolactone) (PCL) was studied in two anaerobic sludges, and individual **polyester** -degrading anaerobic strains were isolated, characterized, and used for degradation expts. under controlled laboratory conditions. Incubation of PHB and PHBV films in two anaerobic sludges exhibited significant degradation in a time scale of 6-10 wk, monitored by weight loss and biogas formation. In contrast to aerobic conditions, PHB was degraded anaerobically more rapidly than the **copolyester** PHBV, when tested with either mixed cultures or a single strained isolate. PCL tends to degrade slower than the natural **polyesters** PHB and PHBV. Four PHB- and PCL-degrading isolates were taxonomically identified and are obviously new species belonging to the genus Clostridium group I. The depolymg. enzyme systems of PHB- and PCL-degrading isolates are supposed to be different. Using one isolated strain in an optimized laboratory degradation test with PHB powder, the degradation time was drastically reduced as compared to the degradation in sludges (2 days vs. 6-10 wk).

L24 ANSWER 8 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

2001:163877 Document No. 134:296432 Biodegradation of **polyesters** containing aromatic constituents. Muller, R.-J.; **Kleeberg, I.**; **Deckwer, W.-D.** (Biochemical Engineering Division, Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, D-38124, Germany). Journal of Biotechnology, 86(2), 87-95 (English) 2001. CODEN: JBITD4. ISSN: 0168-1656. Publisher: Elsevier Science Ltd..

AB Polymers, which undergo a controlled biol. degradation by micro-organisms came to remarkable interest during the last years. Composting for instance could so be established as an alternative waste management system for parts of the plastic waste. Within this group of innovative polymer, **polyesters** play a predominant role, due to their potentially hydrolyzable ester bonds. While aromatic **polyesters** such as poly(ethylene terephthalate) exhibit excellent material properties but proved to be almost resistant to microbial attack, many aliphatic **polyesters** turned out to be biodegradable but lack in properties, which are important for application. To combine good material

properties with biodegradability, aliphatic-aromatic **copolyesters** have been developed as biodegradable polymers for many years. This article reviews, with many refs., the attempts to combine aromatic and aliphatic structures in biodegradable plastics and work, which has been done to evaluate the degradation behavior and environmental safety of biodegradable **polyesters**, containing aromatic constituents.

L24 ANSWER 10 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1998:477876 Document No. 129:203330 Synthesis, characteristics and degradation of synthetic **polyesters**. Muller, R. -J.; Witt, U.; **Deckwer, W. -D.** (Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, D-38124, Germany). International Symposium on Bacterial Polyhydroxyalkanoates, Davos, Switz., Aug. 18-23, 1996, Meeting Date 1996, 78-88. Editor(s): Eggink, Gerrit. National Research Council of Canada: Ottawa, Ont. (English) 1997. CODEN: 66KZA5.

AB The synthesis, material properties and biodegrdn. behavior of a group of **copolyesters** containing aliphatic and aromatic components are described. Up to a fraction of 55 % terephthalic acid, biodegradability of the materials could be observed Investigations of aromatic oligomers as a model for intermediate degradation products demonstrated that oligomers with a length of less than two repeating units are biodegraded rapidly, probably by an intracellular process. At elevated temps. larger oligomers also exhibit significant degradation Here hydrolytic mechanisms may contribute. The properties of the materials are good and adjustable, promising a wide range of applications for such materials.

L24 ANSWER 11 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1998:367968 Document No. 129:54921 Architecture of biodegradable **copolyesters** containing aromatic constituents. Muller, R. -J.; Witt, U.; Rantze, E.; **Deckwer, W. -D.** (Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, Germany). Polymer Degradation and Stability, 59(1-3), 203-208 (English) 1998. CODEN: PDSTDW. ISSN: 0141-3910. Publisher: Elsevier Science Ltd..

AB Aliphatic/aromatic **copolyesters**, especially those synthesized from butanediol, adipic acid, and terephthalic acid, have been shown to represent biodegradable plastics of high com. interest. Within a range of approx. 30-55 mol% terephthalic acid in the acid components such copolymers are an acceptable compromise between use properties and degradation rate. The behavior of aromatic intermediates has been examined by use of specially synthesized aromatic model oligomers. Oligomers with a d.p. of one and two are rapidly degraded by microorganisms; for longer oligomers, only a chemical hydrolysis is postulated at higher temps. By means of enzymic hydrolysis of monomeric model esters with a lipase it was shown that the rigidity, especially of the diacid component, influences the accessibility of the ester bonds to the action of the lipase.

L24 ANSWER 13 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1997:357749 Document No. 126:344175 Biodegradation behavior and material properties of aliphatic/aromatic **polyesters** of commercial importance. Witt, Uwe; Muller, Rolf-Joachim; **Deckwer, Wolf-Dieter** (Gesellschaft Biotechnologische Forschung mbH, Bioverfahrenstechnik, Braunschweig, D-38124, Germany). Journal of Environmental Polymer Degradation, 5(2), 81-89 (English) 1997. CODEN: JEPDED. ISSN: 1064-7546. Publisher: Plenum.

AB **Copolyesters** of aliphatic monomers with defined amount of terephthalic acid recently have been show to be biodegradable. This group of plastics exhibits very interesting material properties with regard to their tech. application

potential. A tensile strength of 25 N/mm2 combined with elongations at break up to 1500% was achieved for BTA materials. M.ps. varied from 80 to 140°C. Biodegrdn. rate under composting conditions were determined, showing typical erosion rates of films, in the range of 5 to 10 μm/wk. The material properties and the degradation rate as well can be adjusted by the copolymer composition Stretching of the polymer in the cold state leads to 10-fold-higher mech. strength of the material. The **polyester** chain can be extended to high molar masses, resulting in melt viscosities suitable, e.g., for melt below extrusion.

L24 ANSWER 14 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1997:350768 Document No. 127:82079 Biological degradable **polyester** copolymers from petrochemical and renewable raw material. Muller, R. J.; Witt, U.; **Deckwer, W. D.** (Gesellschaft Biotechnologische Forschung m.b.H., Braunschweig, D-38124, Germany). Fett/Lipid, 99(2), 40-45 (German) 1997. CODEN: FELIFX. Publisher: Wiley-VCH.

AB A review with 20 refs. Material properties of synthetic, biodegradable aliphatic can be improved by introducing aromatic compds. into polymers. Random aliphatic/aromatic **copolyesters** consisting of components like 1,2-ethanediol (ED), 1,3-propanediol (PD), 1,4-butanediol (BD), adipic acid, sebacic acid, and terephthalic acid (TA) (35-55 mol-% with regard to the diacid components) exhibit m.ps. of ≤ 145°. These **copolyesters** are still biodegradable making this material of great com. interest. Significant weight losses of **polyester** films could be observed in 3 mo soil burial expts.(≤40 mol.-% TA) and in compost simulation tests at 60° (up to 50 mol-% TA). From degradation expts. with aromatic model oligoesters from TA and ED (PD, BD, resp.) it could be concluded that, aromatic intermediates (oligomers) will be assimilated very fast by microorganisms, if the d.p. is 1 or 2. It seems that longer oligomers are not accessable for an enzymic attack, but will probably be hydrolyzed chemical at elevated temps. (60°), too. Using especially screened thermophilic microorganisms (55°) on agar plates and anal. of residual material by size exclusion chromatog., the above mentioned finding could be confirmed. Some of the components of **polyesters** , described here can be obtained from renewable resources. For instance, PD can by produced by a fermentation process from glycerol and a number of aliphatic dicarboxylic acids are available from natural oils. This option can make biodegradable high-tech **polyesters** with a defined structure part of natural cycles.

L24 ANSWER 15 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1997:286260 Document No. 126:264490 Manufacture of biodegradable **polyester**-polyurethanes with increased melt viscosity. **Deckwer, Wolf-Dieter; Mueller, Rolf Joachim;** Witt, Uwe; Arning, Hans-Juergen (Gesellschaft fuer Biotechnologische Forschung Mbh (GBF), Germany; Melitta Haushaltsprodukte Gmbh & Co. Kg). Ger. Offen. DE 19532771 A1 19970306, 9 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1995-19532771 19950905.

AB The title polymers, useful for composites, laminates, monofilaments and fibers, molded articles, especially for blown films, (co)extruded foils and blow-molded and expanded articles, are obtained by polycondensation of aliphatic polyols, an aromatic dicarboxylic acid and an aliphatic dicarboxylic acid, and also a small amount (preferably 0.5-2.0% based on **polyester**) of a diisocyanate. These polymers comprise repeating units made of statistically distributed aliphatic polyol-aromatic dicarboxylic acid and aliphatic polyol-aliphatic dicarboxylic acid units. Thus, a mixture of 1,4-butanediol 358.3, di-Me terephthalate 308.9, adipic acid 348.7, Ti(OCHMe2)4 0.25 and (PhO)3PO 0.25 g was stirred and heated at 190° under N under pressure gradually decreasing to 0.1 hPa to give a prepolymer with mol. weight 50,000 g/mol.

Phosphonic acid (0.5 g) was added at 200° followed by 15 g OCN(CH2)6NCO and the product was cooled and granulated to give a white title polymer (mol. weight 168,500 g/mol, m. 109°) which showed weight loss 78 ± 7% after 8 wk in a compost.

L24 ANSWER 16 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1996:577232 Document No. 125:276845 Mechanistic studies on the biodegradation of **polyester**. **Mueller, R. J.** (Abt.Bioverfahrenstechnik, Gesellschaft Biotechnologische Forschung m.b.H., Braunschweig, D-38124, Germany). DECHEMA Monographien, 133(Biodeterioration and Biodegradation), 211-219 (English) 1996. CODEN: DMDGAG. ISSN: 0070-315X. Publisher: VCH.

AB The mechanism of the microbial and enzymic degradation of aliphatic **polyesters** and aromatic and aliphatic **copolyesters** was studied. Kinetic studies on enzymic hydrolysis with lipase revealed that a length of 6 C atoms in the diacid component was optimal for lipase activity. Degradation depended on the primary structure of the polymer chain and was influenced by the crystallinity and surface properties of the polymer. Investigations of oligomeric model sequences showed that biodegradability was correlated to the solubility of the oligomer indicating an assimilation into cells for metabolization.

L24 ANSWER 17 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1996:431406 Document No. 125:88133 Biodegradable **polyesters** of an aliphatic polyol and aliphatic and aromatic polycarboxylic acids. Witt, Uwe; **Mueller, Rolf-Joachim; Deckwer, Wolf-Dieter** (Gesellschaft Fuer Biotechnologische Forschung Mbh (, Germany). PCT Int. Appl. WO 9607687 A1 19960314, 37 pp. DESIGNATED STATES: W: JP, US; RW: AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE. (English). CODEN: PIXXD2. APPLICATION: WO 1995-EP2722 19950712. PRIORITY: DE 1994-4432161 19940909; DE 1995-19508737 19950310.

AB The title **polyesters**, having good thermal and mech. properties and biodegradability and useful as packaging materials, etc., are prepared from an aliphatic polyol such as HO(CH2)nOH (n = 2-4), an aliphatic polycarboxylic acid such as adipic or sebacic acid, and an aromatic polycarboxylic acid or derivative such as di-Me terephthalate.

L24 ANSWER 18 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1996:273309 Document No. 124:290636 Biodegradable **polyesters** containing aromatic groups. Witt, Uwe; **Mueller, Rolf-Joachim; Deckwer, Wolf-Dieter** (Gesellschaft fuer Biotechnologische Forschung Mbh (GBF), Germany). Ger. Offen. DE 4432161 A1 19960314, 18 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1994-4432161 19940909.

AB Title polymers with good thermal and mech. properties contained condensed monomer units (a) of an aliphatic and aromatic polyol with an aliphatic polycarboxylic acid, (b) of an aliphatic polyol and optionally, an aromatic polyol with an aromatic and an aliphatic polycarboxylic acid, or (c) of an aromatic and an aliphatic hydroxy carboxylic acid. A typical polymer with weight-average mol. weight 30,000-70,000 was manufactured by polymerization of 0.207 mol 1,3-propanediol with 0.074 mol di-Me terephthalate and 0.112 mol adipic acid at 170° in the presence of Zn(OAc)2.

L24 ANSWER 21 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1996:157980 Document No. 124:233770 Evaluation of the biodegradability of **copolyesters** containing aromatic compounds by investigations of model oligomers. Witt, U.; **Mueller, R. -J.; Deckwer, W. -D.** (Gesellschaft Biotechnologische Forschung mbH, Braunschweig,

D-38124, Germany). Journal of Environmental Polymer Degradation, 4(1), 9-20 (English) 1996. CODEN: JEPDED. ISSN: 1064-7546. Publisher: Plenum.

AB Model oligo esters of terephthalic acid with 1,2-ethanediol, 1,3-propanediol, and 1,4-butanediol have been investigated with regard to their biodegradability in different biol. environments. Well-characterized oligomers with weight-average molar masses of from 600 to 2600 g/mol exhibit biodegrdn. in aqueous systems, soil, and compost at 60°C. Size-exclusion chromatog. (SEC) investigations showed a fast biol. degradation of the oligomer fraction consisting of 1 or 2 repeating units, independent of the diol component used for polycondensation, while **polyester** oligomers with ds.p. higher than 2 were stable against microbial attack at room temperature in a time frame of 2 mo. At 60°C in a compost environment chemical hydrolysis also degrades chains longer than two repeating units, resulting in enhanced degradability of the oligomers. Metabolization of the monomers and the dimers as well by the microorganisms could be confirmed by comparing SEC measurements and carbon balances in a "Sturn test" experiment Based on these results degradation characteristics of potential oligomer intermediates resulting from a primary chain scission from **copolyesters** consisting of aromatic and aliphatic dicarbonxylic acids can be predicted depending on their composition These results will have an evident influence on the evaluation of the biodegradability of com. interesting **copolyesters** and lead to new ways of tailor-made designing of new biodegradable materials as well.

L24 ANSWER 22 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

1996:1223 Document No. 124:118696 Biodegradation of **polyester** copolymers containing aromatic compounds. Witt, U.; **Mueller, R. -J.; Deckwer, W. -D.** (Biochemical Engineering, GBF, Gesellschaft fur Biotechnologische Forschung mbH, Braunschweig, D-38124, Germany). Plastics Engineering (New York), 29(Degradable Polymers, Recycling, and Plastics Waste Management), 259-64 (English) 1995. CODEN: PLENEZ. ISSN: 1040-2527. Publisher: Dekker.

AB For investigation of the microbial accessibility of **polyesters** based on 1,3-propanediol, a series of different polymer structures (homo, random, and block copolymers) were synthesized by polycondensation of terephthalic acid, adipic acid, sebacic acid, and 1,3-propanediol. The alc. component, 1,3-propanediol, can be obtained from a biotechnol. process from glycerol, a surplus product of the oleochem. industry. Aliphatic dicarbonic acids can be derived from vegetable oils. Biodegrdn. was performed in different test systems: (1) **polyester** films were exposed to an aerated liquid medium inoculated with eluates from soil and (2) polymer films were buried in soil. **Copolyesters** exhibited significant differences in both tests. Furthermore, a clear influence of the polymeric structure as well as of the chain length of the aliphatic dicarbonic acids on the microbial accessibility was observed

L24 ANSWER 23 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN

1995:898180 Document No. 123:315255 New biodegradable **polyester** -copolymers from commodity chemicals with favorable use properties. Witt, Uwe; **Mueller, Rolf-Joachim; Deckwer, Wolf-Dieter** (Gesellschaft Biotechnologische Forschung MbH, Bioverfahrenstechnik, Braunschweig, D-38124, Germany). Journal of Environmental Polymer Degradation, 3(4), 215-23 (English) 1995. CODEN: JEPDED. ISSN: 1064-7546. Publisher: Plenum.

AB **Copolyesters** composed of aliphatic and aromatic compds. were synthesized by the polycondensation of 1,2-ethanediol, 1,3-propanediol, 1,4-butanediol, sebacic acid, adipic acid, and terephthalic acid. By applying an appropriate ratio of aliphatic to aromatic acids, the synthesized materials proved to be biodegradable, as was verified by several degradation test methods such as aqueous polymer suspension inoculated by a soil eluate (Sturm test), a soil

burial test (at ambient temperature), and a composting simulation test at 60°. The degradability of the **polyester** -copolymers (measured as weight loss) was investigated with respect to the aliphatic monomer components and the fraction of terephthalic acid. Excellent biodegradability was observed even for copolymers with a content of terephthalic acid up to 56 mol% (of the acid fraction) and m.ps. in the range up to 140°. Degradation by chemical hydrolysis of the **polyesters** was determined independently and was found to facilitate microbial attack significantly only at higher temps. The findings demonstrate that biodegradable polymers with advantageous usage properties can easily be manufactured by conventional techniques from commodity chems. (adipic acid, terephthalic acid, and ethylene glycol or 1,4-butanediol).

L24 ANSWER 24 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1995:730916 Document No. 123:113546 Biodegradable **polyester** copolymers with adaptable application properties based on chemical bulk products. Witt, Uwe; **Mueller, Rolf-Joachim; Deckwer, Wolf-Dieter** (GBF, Braunschweig, 38124, Germany). Chemie-Ingenieur-Technik, 67(7), 904-7 (German) 1995. CODEN: CITEAH. ISSN: 0009-286X. Publisher: VCH.
AB A review, with 11 refs. on statistical **copolyesters** of C2-6-diols with adipic, sebacic, and terephthalic acids and their biodegradability in various testing systems.

L24 ANSWER 25 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1995:605010 Document No. 123:229789 Biodegradable plastics with adjustable application properties on the basis of chemical mass products. Mueller, J.; **Deckwer, W. D.** (GBF-Bioverfahrenstech., Braunschweig, D-38124, Germany). Oesterreichische Chemie Zeitschrift, 96(1), 4-7 (German) 1995. CODEN: OCMZAX. ISSN: 0379-5314. Publisher: Verlag Lorenz.
AB Statistical **copolyesters** were prepared by conventional methods from aliphatic and aromatic dicarboxylic acids (adipic, sebacic, and terephthalic acid) and alkanediols and their biodegradability was tested in an aquatic system, soil, or compost for 12 wk. **Copolyesters** containing 35-55 mol % aromatic dicarboxylic acid had usable properties, especially those with 1,2-ethanediol or 1,4-butanediol and were extensively biodegradable within 8-12 wk in soil or compost.

L24 ANSWER 26 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1995:478613 Document No. 122:309552 Enzymic degradation of a model **polyester** by lipase from Rhizopus delemar. Walter, Torsten; Augusta, Josef; **Mueller, Rolf-Joachim**; Widdecke, Hartmut; Klein, Joachim (Gesellschaft fuer Biotechnol. Forschung mbH, Braunschweig, Germany). Enzyme and Microbial Technology, 17(3), 218-24 (English) 1995. CODEN: EMTED2. ISSN: 0141-0229. Publisher: Elsevier.
AB Enzymic degradation of a model **polyester** was studied under varying conditions. Poly(trimethylene succinate) was hydrolyzed by the use of lipase from Rhizopus delemar. An enzyme assay was adjusted for the use of insol. substrates and gave well-reproducible data. Ester bond cleavage was measured with respect to time. Comparison of ester cleavage and weight loss -a commonly used technique in the evaluation of polymer biodegrdn.- indicated that oligomers with an average length of five to six monomers are released from polymer bulk. Thus, weight loss as well as dissolved organic carbon measurements will not give information on real enzymic degradation activity, because solubility properties of oligomers are superimposed. Time-dependent degradation profiles are strongly influenced by the materials surface (film or polydisperse powder) as well as the addition of surfactants. The use of Triton X-45 did not assist

the degradation of the insol. substrate, as it did with commonly applied emulsions of liquid substrates. On the contrary, at concns. above 0.5% (vol/vol), the addition of Triton X-45 inhibited enzymic degradation to a great extent.

L24 ANSWER 27 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1995:477380 Document No. 122:267336 Biodegradation of **polyester** copolymers containing aromatic compounds. Witt, U.; **Mueller, R.-J.; Deckwer, W.-D.** (Ges. Biotechnol. Forsch. mbH, Braunschweig, D-38124, Germany). Journal of Macromolecular Science, Pure and Applied Chemistry, A32(4), 851-6 (English) 1995. CODEN: JSPCE6. ISSN: 1060-1325. Publisher: Dekker.

AB For the study of the microbial accessibility of **polyesters** based on 1,3-propanediol, a series of polymer structures (homo, random, and block copolymers) were synthesized by polycondensation of terephthalic acid, adipic acid, sebacic acid, and 1,3-propanediol. The alc. component, 1,3-propanediol, can be obtained from a biotechnol. process from glycerol, a surplus product of the oleochem. industry. Aliphatic dicarboxylic acids can be derived from vegetable oils. Biodegrdn. was performed in different test systems. **Polyester** films were exposed to an aerated liquid medium inoculated with eluates from soil. For this test system, polymer films were buried in soil. **Copolyesters** exhibited significant differences in both tests. A clear influence of the polymeric structure as well as the chain length of the aliphatic dicarboxylic acids on the microbial accessibility was observed

L24 ANSWER 29 OF 35 CAPLUS COPYRIGHT 2004 ACS on STN
1994:165100 Document No. 120:165100 Synthesis, properties and biodegradability of **polyesters** based on 1,3-propanediol. Witt, Uwe; **Mueller, Rolf-Joachim;** Augusta, Josef; Widdecke, Hartmut; **Deckwer, Wolf-Dieter** (Ges. Biotechnol. Forsch., Braunschweig, D-38124, Germany). Macromolecular Chemistry and Physics, 195(2), 793-802 (English) 1994. CODEN: MCHPES. ISSN: 1022-1352.

AB Aliphatic **homopolyesters** and **copolyesters** based on 1,3-propanediol and containing terephthalic acid as aromatic compound and sebacic acid as aliphatic compound were synthesized by condensation in bulk. The intrinsic viscosity and weight-average mol. weight were measured. The melting temps. were studied by differential scanning calorimetry. The biodegradability was tested for all **polyesters** . The test media were inoculated with either municipal compost eluate or decanted sewage sludge. The criteria measured were visible changes, weight loss, and SEM indicating the visible changes of the surface. The compns. of **copolyesters** were characterized by 13C NMR spectroscopy. It was concluded that the biodegradability depends substantially on the sequential structure of the polymer.

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FILE 'REGISTRY' ENTERED AT 11:26:26 ON 26 MAY 2004

=> S CUTINASE/CN
L1             1 CUTINASE/CN

=> D

L1   ANSWER 1 OF 1  REGISTRY  COPYRIGHT 2004 ACS on STN
RN   51377-41-4  REGISTRY
CN   Cutinase (9CI)  (CA INDEX NAME)
OTHER NAMES:
CN   Cutin esterase
CN   Cutin hydrolase
CN   E.C. 3.1.1.74
MF   Unspecified
CI   COM, MAN
LC   STN Files:   AGRICOLA, ANABSTR, BIOBUSINESS, BIOSIS, BIOTECHNO, CA,
       CAPLUS, CASREACT, CIN, EMBASE, PROMT, TOXCENTER, USPAT2, USPATFULL
DT.CA  CAplus document type:  Conference; Dissertation; Journal; Patent; Report
RL.P   Roles from patents:  ANST (Analytical study); BIOL (Biological study);
       FORM (Formation, nonpreparative); OCCU (Occurrence); PREP (Preparation);
       PROC (Process); PRP (Properties); USES (Uses)
RLD.P  Roles for non-specific derivatives from patents:  BIOL (Biological
       study); PREP (Preparation); PROC (Process); PRP (Properties); RACT
       (Reactant or reagent); USES (Uses)
RL.NP  Roles from non-patents:  ANST (Analytical study); BIOL (Biological
       study); FORM (Formation, nonpreparative); MSC (Miscellaneous); OCCU
       (Occurrence); PREP (Preparation); PROC (Process); PRP (Properties); RACT
       (Reactant or reagent); USES (Uses); NORL (No role in record)
RLD.NP Roles for non-specific derivatives from non-patents:  BIOL (Biological
       study); PREP (Preparation); PROC (Process); PRP (Properties)

*** STRUCTURE DIAGRAM IS NOT AVAILABLE ***
            562 REFERENCES IN FILE CA (1907 TO DATE)
             25 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
            564 REFERENCES IN FILE CAPLUS (1907 TO DATE)

FILE 'CAPLUS' ENTERED AT 11:26:46 ON 26 MAY 2004

=> S CUTINASE;S L1 OR L2;S THERMOMONOSPORA
          625 CUTINASE
           70 CUTINASES
L2        632 CUTINASE
                (CUTINASE OR CUTINASES)


          564 L1
L3        636 L1 OR L2


          387 THERMOMONOSPORA
            1 THERMOMONOSPORAS
L4        388 THERMOMONOSPORA
                (THERMOMONOSPORA OR THERMOMONOSPORAS)

=> S L3 AND L4
L5             3 L3 AND L4

=> D 1-3 CBIB ABS
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L5 ANSWER 1 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN

2001:480571 Document No. 135:78200 Enzymatic modification of the surface of a polyester fiber or article. Kellis, James T., Jr.; Poulose, Ayrookaran J.; Yoon, Mee-Young (Genencor International, Inc., USA). U.S. US 6254645 B1 20010703, 12 pp., Cont.-in-part of U.S. Ser. No. 378,087, abandoned. (English). CODEN: USXXAM. APPLICATION: US 1999-435083 19991105. PRIORITY: US 1999-378087 19990820.

AB A method is provided for improving the uptake of a cationic compound onto a polyester article starting material, comprising the steps of: (a) obtaining a polyesterase enzyme; (b) contacting the polyesterase enzyme with the polyester article starting material under conditions and for a time suitable for the polyesterase to produce surface modification of the polyester article starting material and produce a surface modified polyester; (c) contacting the modified polyester article, subsequently or simultaneously with said step (b) with a cationic compound whereby adherence of said cationic compound to the modified polyester is increased compared to said polyester starting material. Also disclosed is a method for increasing the hydrophilicity of a polyester to improve fabric characteristics such as stain resistance, wettability and/or dyeability.

L5 ANSWER 2 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN

2001:360246 Document No. 134:368228 Enzymes useful for changing the properties of polyester fibers. Dyson, Wade; Kellis, James T., Jr.; Poulose, Ayrookaran J.; Yoon, Mee-Young (Genencor International, Inc., USA). PCT Int. Appl. WO 2001034899 A1 20010517, 32 pp. DESIGNATED STATES: W: AE, AL, AM, AT, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, CZ, DE, DE, DK, DK, DM, EE, EE, ES, FI, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 2000-US27917 20001010. PRIORITY: US 1999-435461 19991105.

AB A method is provided for enzymically modifying a polyester resin, film, fiber, yarn, fabric or textile with a polyesterase to modify the characteristics thereof.

L5 ANSWER 3 OF 3 CAPLUS COPYRIGHT 2004 ACS on STN

1999:284537 Document No. 131:113492 Production of **cutinase** by **Thermomonospora** fusca ATCC 27730. Fett, W. F.; Wijey, C.; Moreau, R. A.; Osman, S. F. (ARS, Eastern Regional Research Center, Plant Science & Technology Research Unit, USDA, Wyndmoor, PA, 19038, USA). Journal of Applied Microbiology, 86(4), 561-568 (English) 1999. CODEN: JAMIFK. ISSN: 1364-5072. Publisher: Blackwell Science Ltd..

AB Ten strains belonging to various **Thermomonospora** species were tested for their ability to hydrolyze the insol. plant polyester cutin. One strain, the thermophile T. fusca ATCC 27730, was found to produce a highly inducible **cutinase** when grown in broth medium containing purified apple cv. Golden Delicious cutin. Apple pomace, tomato peel, potato suberin and com. cork were also shown to induce **cutinase** production Addition of glucose to the culture medium either at the beginning of fermentation or after 2 days of incubation in the presence of apple cutin led to repression of **cutinase** production The **cutinase** was active against a wide range of cutins, including those isolated from other apple cultivars as well as tomato, cucumber, grapefruit, and green pepper. **Cutinase** activity in the induced culture supernatant fluids exhibited a half-life of over 60 min at 70°C and a pH optimum of 11.0. Some potential applications for **cutinases** are discussed.

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=> S MICROORGANISM
         82200 MICROORGANISM
         84692 MICROORGANISMS
L6      139301 MICROORGANISM
                (MICROORGANISM OR MICROORGANISMS)

=> S L6 AND L3
L7           43 L6 AND L3

=> D 1-43 TI

=> D 5,10,28,30,36,42 CBIB ABS

L7   ANSWER 5 OF 43  CAPLUS  COPYRIGHT 2004 ACS on STN
2002:649091   Document No. 137:334578  Distinction between esterases and
     lipases: a kinetic study with vinyl esters and TAG.  Chahinian, Henri;
     Nini, Lylia; Boitard, Elisabeth; Dubes, Jean-Paul; Comeau, Louis-Claude;
     Sarda, Louis (Laboratoire de Lipolyse Enzymatique, CNRS, Marseille, 13402,
     Fr.).  Lipids, 37(7), 653-662 (English) 2002.  CODEN: LPDSAP.  ISSN:
     0024-4201.  Publisher: AOCS Press.
AB   The better to characterize enzymes hydrolyzing carboxyl ester bonds (carboxyl
     ester hydrolases), we have compared the kinetic behavior of various lipases
     and esterases against solns. and emulsions of vinyl esters and triacylglycerol
     (TAG).  Short-chain vinyl esters are hydrolyzed at comparable rates by
     esterases and lipases and have higher limits of solubility in water than
     corresponding TAG.  Therefore, they are suited to study the influence of the
     phys. state of the substrate on carboxyl ester hydrolase activity within a
     large concentration range.  Enzymes used in this study are TAG lipases from
     microorganisms, lipases from human and guinea pig pancreas, pig liver
     esterase, and acetylcholinesterase.  This study also includes cutinase, a
     fungal enzyme that displays functional properties between esterases and
     lipases.  Esterases display maximal activity against solns. of short-chain
     vinyl esters (vinyl acetate, vinyl propionate, and vinyl butyrate) and TAG
     (triacetin, tripropionin, and tributyrin).  Half-maximal activity is reached
     at ester concns. far below the solubility limit.  The transition from solution
     to emulsion at substrate concns. exceeding the solubility limit has no effect
     on esterase activity.  Lipases are active on solns. of short-chain vinyl esters
     and TAG but in contrast to esterases, they all display maximal activity
     against emulsified substrates and half-maximal activity is reached at
     substrate concns. near the solubility limit of the esters.  The kinetics of
     hydrolysis of soluble substrates by lipases are either hyperbolic or deviate
     from the Michaelis-Menten model and show no or weak interfacial activation.
     The presence of mol. aggregates in solns. of short-chain substrates, as
     evidenced by a spectral dye method, likely accounts for the activity of
     lipases against soluble esters.  Unlike esterases, lipases hydrolyze emulsions
     of water-insol. medium- and long-chain vinyl esters and TAG such as vinyl
     laurate, trioctanoin, and olive oil.  In conclusion, comparisons of the
     kinetic behavior of carboxyl ester hydrolases against solns. and emulsions of
     vinyl esters and TAG allows the distinction between lipases and esterases.  In
     this respect, it clearly appears that guinea pig pancreatic lipase and
     cutinase are unambiguously classified as lipases.


L7   ANSWER 10 OF 43  CAPLUS  COPYRIGHT 2004 ACS on STN
2001:453240   Document No. 135:62103  Subtilase variants having an improved
     wash performance on egg stains.  Fano, Tina Sejersgaard; Mikkelsen, Frank
     F. (Novozymes A/S, Den.).  PCT Int. Appl. WO 2001044452 A1 20010621, 137
     pp.  DESIGNATED STATES: W:  AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR,
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BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (English). CODEN: PIXXD2. APPLICATION: WO 2000-DK660 20001201. PRIORITY: DK 1999-1792 19991215; DK 2000-708 20000501; DK 2000-1527 20001013.

AB The present invention relates to the use of a subtilase variant for removal of egg stains from laundry or from hard surfaces, where the subtilase variant comprises at least one addnl. amino acid residue in the active site loop (b) region from position 95 to 103 (BASBPN numbering). Subtilase variants derived from Bacillus lentus subtilisin 309 (Savinase) exhibit excellent or improved wash performance on egg stains when used in e.g. cleaning or detergent compns., including automatic dishwashing compns. and laundry detergent compns. The present invention also relates to novel subtilase variants, to isolated DNA sequences encoding the variants, expression vectors, host cells, and methods for producing and using the variants of the invention. Further, the present invention relates to cleaning and detergent compns. comprising the variants of the invention. Protocols are also provided for determination of enzyme performance by an Ovo-inhibition assay and a Model Detergent Wash Performance Test.

L7 ANSWER 28 OF 43 CAPLUS COPYRIGHT 2004 ACS on STN

1999:64911 Document No. 130:121426 Alkaline xyloglucanases from Bacillus suitable for fabric detergents. Schulein, Martin; Outtrup, Helle; Jorgensen, Per Lina; Bjornvad, Mads Eskelund (Novo Nordisk A/S, Den.). PCT Int. Appl. WO 9902663 A1 19990121, 87 pp. DESIGNATED STATES: W: AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CU, CZ, DE, DK, EE, ES, FI, GB, GE, GH, GM, GW, HR, HU, ID, IL, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, UZ, VN, YU, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG. (English). CODEN: PIXXD2. APPLICATION: WO 1998-DK290 19980701. PRIORITY: DK 1997-822 19970707; DK 1997-1213 19971024.

AB A xyloglucanase having a relative xyloglucanase activity of ≥50% at pH 7 and either no or an insignificant cellulolytic activity is obtainable e.g. from a strain of Bacillus. The xyloglucanase may comprise an amino acid sequence of the mature enzymes isolated from B. licheniforms ATCC 14580 or B. agaradhaerens NCIMB 40482. Genes encoding the xyloglucanases were isolated and sequenced from the 2 Bacillus strains. The xyloglucanases are useful e.g. in cleaning compns. and for treatment of cellulosic fibers.

L7 ANSWER 30 OF 43 CAPLUS COPYRIGHT 2004 ACS on STN

1999:39003 Document No. 130:179186 A second polycaprolactone depolymerase from Fusarium, a lipase distinct from **cutinase**. Murphy, C. A.; Cameron, J. A.; Huang, S. J.; Vinopal, R. T. (Department of Molecular and Cell Biology, University of Connecticut, Storrs, CT, 06269-3044, USA). Applied Microbiology and Biotechnology, 50(6), 692-696 (English) 1998. CODEN: AMBIDG. ISSN: 0175-7598. Publisher: Springer-Verlag.

AB Polycaprolactone (PCL), a synthetic polyester with applications in biodegradable plastics, is degraded by a variety of **microorganisms** , including fungal phytopathogens. These pathogens secrete **cutinase**, which hydrolyzes cutin, the polyester structural component of plant cuticle, releasing ω-hydroxy fatty acids that induce **cutinase** synthesis. The authors' laboratory previously reported that growth of Fusarium solani on PCL requires **cutinase** ,

which is active as a PCL depolymerase and induced by the products of its action on PCL. A mutant strain of F. solani in which the **cutinase** gene is deleted was unable to grow on PCL and did not secrete PCL depolymerase activity in the media tested. It is shown here that this mutant produces a PCL depolymerase in media containing lipase inducers. Wild-type strains also produce this 2nd PCL depolymerase, which is induced by Tween 80 and tributyrin, but not by PCL or cutin. The 2nd depolymerase shows interfacial activation, indicating that it is a lipase. PCL may thus be a substrate but not an inducer of depolymerases that degrade it, and screening **microorganisms** on medium with PCL as the sole source of C and energy may fail to reveal strains with active PCL depolymerases, because of the absence of an inducer. Surprisingly, Tween 80 induced both **cutinase** and lipase activities in wild-type F. solani.

L7 ANSWER 36 OF 43 CAPLUS COPYRIGHT 2004 ACS on STN

1996:88463 Document No. 124:139536 Fusarium polycaprolactone depolymerase is **cutinase**. Murphy, Catherine A.; Cameron, J. A.; Huang, Samuel J.; Vinopal, Robert T. (Dep. Molecular Cell Biology, Univ. Connecticut, Storrs, CT, 06269-3044, USA). Applied and Environmental Microbiology, 62(2), 456-60 (English) 1996. CODEN: AEMIDF. ISSN: 0099-2240. Publisher: American Society for Microbiology.

AB Polycaprolactone (PCL), a synthetic polyester, is degraded by a variety of **microorganisms**, including some phytopathogens. Many phytopathogens secrete **cutinase**, a serine hydrolase that degrades cutin, the structural polymer of the plant cuticle. The authors compared wild-type strains and a **cutinase**-neg. gene replacement mutant strain of Fusarium solani f. sp. pisi (D. J. Stahl and W. Schaefer, Plant Cell 4:621-629, 1992) and a wild-type strain of Fusarium moniliforme to show that Fusarium **cutinase** is a PCL depolymerase. The wild-type strains, but not the mutant strain, (i) degraded PCL and used it as a source of carbon and energy, (ii) showed induction of secreted PCL depolymerase and an esterase activity of **cutinase** when grown in the presence of cutin, and (iii) showed induction of PCL depolymerase and an esterase activity of **cutinase** when grown in the presence of a hydrolyzate of PCL, which contains PCL oligomers that are structurally similar to the natural inducers of **cutinase**. These results together with other details of regulation and conditions for optimal enzyme activity indicate that the Fusarium PCL depolymerase, required for degradation and utilization of PCL, is **cutinase**.

L7 ANSWER 42 OF 43 CAPLUS COPYRIGHT 2004 ACS on STN

1989:591269 Document No. 111:191269 Properties of a **cutinase** -defective mutant of Fusarium solani. Dantzig, Anne H. (Lilly Res. Lab., Eli Lilly and Co., Indianapolis, IN, 46285, USA). ACS Symposium Series, 399(Plant Cell Wall Polym.), 399-409 (English) 1989. CODEN: ACSMC8. ISSN: 0097-6156.

AB The fungal plant pathogen F. solani produces an extracellular enzyme, **cutinase**, which catalyzes the degradation of the bipolymer, cutin, in the plant cuticle. The enzyme was repressed when the **microorganism** was grown on a medium containing glucose and induced to high levels by cutin or its hydrolysis products, the true inducers. In the present study, culture filtrates contained basal levels of **cutinase** when Fusarium was grown on 0.5% acetate as the sole carbon source and high levels of **cutinase** when grown on cutin. After mutagenesis, a **cutinase**-defective mutant of Fusarium was identified by screening acetate-grown colonies for a loss of enzyme activity. The mutant exhibited an 80-90% reduction in **cutinase** activity under several growth conditions due to a quant. reduction in a qual. normal enzyme. The mutant also exhibited a reduction in virulence in the pea stem bioassay. Taken together, these data indicated that a growth condition exists where the **cutinase** enzyme was neither induced nor repressed and was present in basal

levels. This condition may pose the pathogen for rapid enzyme induction when in the proximity of the plant cuticle. The **cutinase**-defective mutant was either a regulatory mutant with an altered expression of **cutinase**, or a mutant modified in its ability to excrete the enzyme.

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=> S FUNGUS OR FUNGI
         42895 FUNGUS
            19 FUNGUSES
         64323 FUNGI
             7 FUNGIS
         94729 FUNGUS
                 (FUNGUS OR FUNGUSES OR FUNGI OR FUNGIS)
         64323 FUNGI
             7 FUNGIS
         64328 FUNGI
                 (FUNGI OR FUNGIS)
L8       94729 FUNGUS OR FUNGI

=> S L3 AND L8
L9         187 L3 AND L8

=> S L3(6A)L8
L10         55 L3(6A)L8

=> S L3(3A)L8
L11         41 L3(3A)L8

=> S L3(2A)L8
L12         34 L3(2A)L8

=> D L10 1-55 TI
=> D L10 7,9,13,25,27-30,39,50-53 CBIB ABS

L10  ANSWER 7 OF 55  CAPLUS  COPYRIGHT 2004 ACS on STN
2001:223485  Document No. 134:364046  Polyesters in higher plants.
     Kolattukudy, Pappachan E. (The Ohio State University, Columbus, OH, 43210,
     USA). Advances in Biochemical Engineering/Biotechnology,
     71(Biopolyesters), 1-49 (English) 2001. CODEN: ABEBDZ. ISSN: 0724-6145.
     Publisher: Springer-Verlag.
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AB A review with 188 refs. Polyesters occur in higher plants as the structural component of the cuticle that covers the aerial parts of plants. This insol. polymer, called cutin, attached to the epidermal cell walls is composed of interesterified hydroxy and hydroxy epoxy fatty acids. The most common chief monomers are 10,16-dihydroxy C16 acid, 18-hydroxy-9,10 epoxy C18 acid, and 9,10,18-trihydroxy C18 acid. These monomers are produced in the epidermal cells by ω hydroxylation, in-chain hydroxylation, epoxidn. catalyzed by P450-type mixed function oxidase, and epoxide hydration. The monomer acyl groups are transferred to hydroxyl groups in the growing polymer at the extracellular location. The other type of polyester found in the plants is suberin, a polymeric material deposited in the cell walls of a layer or two of cells when a plant needs to erect a barrier as a result of phys. or biol. stress from the environment, or during development. Suberin is composed of aromatic domains derived from cinnamic acid, and aliphatic polyester domains derived from C16 and C18 cellular fatty acids and their elongation products. The polyesters can be hydrolyzed by pancreatic lipase and **cutinase**, a polyesterase produced by bacteria and **fungi**. Catalysis by cutinase involves the active serine catalytic triad. The major function of the polyester in plants is as a protective barrier against phys., chemical, and biol. factors in the environment, including pathogens. Transcriptional regulation of cutinase gene

in fungal pathogens is being elucidated at a mol. level. The polyesters present in agricultural waste may be used to produce high value polymers, and genetic engineering might be used to produce large quantities of such polymers in plants.

L10 ANSWER 9 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
2000:663092 Document No. 134:159241 Affinity Purification and Characterization of a Cutinase from the Fungal Plant Pathogen Monilinia fructicola (Wint.) Honey. Wang, Guang-Yi; Michailides, Themis J.; Hammock, Bruce D.; Lee, Young-Moo; Bostock, Richard M. (Department of Plant Pathology, University of California, Davis, Davis, CA, 95616, USA). Archives of Biochemistry and Biophysics, 382(1), 31-38 (English) 2000. CODEN: ABBIA4. ISSN: 0003-9861. Publisher: Academic Press.

AB Trifluoromethyl ketones (TFK) are potent inhibitors of a variety of serine hydrolases. The TFK inhibitor, 3-(4-mercaptobutylthio)-1,1,1-trifluoro-2-propanone (MBTFP), was found to competitively inhibit cutinase activity (I50 = 9.4+10-3) from the fungal plant pathogen Monilinia fructicola and to serve as an effective affinity ligand for the purification of cutinases from culture filtrates. The TFK inhibitors, 3-n-octylthio-1,1,1-trifluoro- 2-propanone (OTFP) and 3-n-pentylthio-1,1,1-trifluoro-2-propanone (PTFP), also inhibited cutinase activity with I50 values of 1.6+10-6 and 2.3+10-4 M, resp. Buffer containing OTFP was the strongest eluant for cutinases of M. fructicola and provided the best purification factor and yield, although buffers containing OTFP, detergent, and salt were found to be effective for eluting cutinases bound to MBTFP-Sepharose. Buffer containing 0.5% Triton X-100 also selectively eluted cutinases from the affinity column. Two-dimensional electrophoretic anal. by SDS-PAGE and isoelec. focusing of the affinity-purified cutinase fraction indicated activity associated with proteins of pI 8.2 and mol. masses of approx. 18.6 and 20.8 kDa. These proteins hydrolyzed [3H]cutin and artificial substrates such as p-nitrophenylbutyrate and related esters, typical of other cutinases, but differ from previously characterized cutinases in mol. mass. The two low-mol.-weight proteins resolved by 2-D gel electrophoresis were subjected to in-gel digestion with Lys-C and the resulting peptide fragments were separated by Microbore-HPLC. The amino acid sequences of several internal peptide fragments had high homol. with **cutinase** sequences from other **fungi**, particularly the plant pathogen Botrytis cinerea. Our study illustrates the potential of TFK ligands for the affinity purification of cutinases and indicates that the cutinases from M. fructicola have novel features warranting further study. (c) 2000 Academic Press.

L10 ANSWER 13 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
2000:398288 Document No. 133:117517 Transgenic Arabidopsis plants expressing a fungal cutinase show alterations in the structure and properties of the cuticle and postgenital organ fusions. Sieber, Patrick; Schorderet, Martine; Ryser, Ulrich; Buchala, Antony; Kolattukudy, Pappachan; Metraux, Jean-Pierre; Nawrath, Christiane (Department of Biology, Unit of Plant Biology, University of Fribourg, Fribourg, CH-1700, Switz.). Plant Cell, 12(5), 721-737 (English) 2000. CODEN: PLCEEW. ISSN: 1040-4651. Publisher: American Society of Plant Physiologists.

AB A major structural component of the cuticle of plants is cutin. Anal. of the function of cutin in vivo has been limited because no mutants with specific defects in cutin have been characterized. Therefore, transgenic Arabidopsis plants were generated that express and secrete a cutinase from Fusarium solani f sp pisi. Arabidopsis plants expressing the cutinase in the extracellular space showed an altered ultrastructure of the cuticle and an enhanced permeability of the cuticle to solutes. In addition, pollen could germinate on fully differentiated leaves of cutinase-expressing plants but not on control leaves. These differences coincided with strong postgenital organ

fusions. The junctions of the fusions contained pectic polysaccharides. As fused organs grew apart from each other, organ deformations and protrusions of epidermal cells developed at positions with high mech. stress. These results demonstrate that an intact cutin layer not only is important for plant-environment interactions but also prevents fusions between different plant organs and is therefore necessary for normal epidermal differentiation and organ formation.

L10 ANSWER 25 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1995:464191 Document No. 122:260765 Diversity of **cutinases** from plant pathogenic **fungi**: different **cutinases** are expressed during saprophytic and pathogenic stages of Alternaria brassicicola. Yao, Chenglin; Koeller, Wolfram (Department Plant Pathology, Cornell University, Geneva, NY, 14456, USA). Molecular Plant-Microbe Interactions, 8(1), 122-30 (English) 1995. CODEN: MPMIEL. ISSN: 0894-0282. Publisher: American Phytopathological Society.

AB The cutinase gene CUTAB1 of Alternaria brassicicola was disrupted by biolistic transformation of conidia with vector pDABC1, containing flanking regions of the cutinase gene fused to a selectable marker construct. Disruption of the cutinase gene had an impact on saprophytic stages of CUTAB1- mutants. The cutinase isoenzymes Ac and Ba, which are predominantly expressed by the wild-type strain during saprophytic growth on polymer cutin, were not expressed by resp. mutants, and cutin was no longer utilized as a saprophytic carbon source. This correlation suggests a crucial role of CUTAB1 expression during saprophytic stages of the pathogen. Disruption of CUTAB1 had no significant effect on the pathogenicity and tissue specificity of CUTAB1- mutants. Although the two cutinase isoenzymes expressed by the wild-type strain under saprophytic growth conditions were not produced by CUTAB1- mutants in contact with the polymer cutin, low levels of two serine hydrolases with mol. wts. of 31 and 19 kDa were specifically induced and expressed. The mixture of these hydrolases exhibited cutinase activity. The same hydrolases were expressed by both the wild-type strain and CUTAB1- mutants during early stages of host infection. In contrast, the gene products of the cutinase gene CUTAB1 with crucial functions in saprophytic stags were not detected on host surfaces inoculated with the wild-type strain. The results suggest that different cutinases evolved with important functions in either saprophytic or pathogenic stags of the pathogen.

L10 ANSWER 27 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1995:289823 Document No. 122:75284 Purification and characterization of a novel lipolytic enzyme from Aspergillus oryzae. Ohnishi, Kunio; Yoshida, Yohko; Toita, Jinichi; Sekiguchi, Junichi (Res. Inst., Takeya Miso Co., Ltd., Nagano, 390, Japan). Journal of Fermentation and Bioengineering, 78(6), 413-19 (English) 1994. CODEN: JFBIEX. ISSN: 0922-338X. Publisher: Society for Fermentation and Bioengineering, Japan.

AB Aspergillus oryzae produced at least two kinds of extracellular lipolytic enzymes when cultured in a submerged culture medium containing 3% soybean oil. The enzymes, L1 and L2, exhibited higher substrate specificity toward dimercaptobutyrate and olive oil, resp. The lipolytic enzyme (L1) was purified from the culture filtrate to homogeneity by ammonium sulfate and acetone precipitation, DEAE-cellulose column chromatog., palmitoylated-gauze column chromatog., DEAE-Sephadex A-50 column chromatog. and gel filtration, and was a monomeric protein with a mol. mass of 24 kDa estimated by gel filtration and sodium dodecylsulfate-polyacrylamide gel electrophoresis (SDS-PAGE). The enzyme showed little preference for triacylglycerols, and also exhibited high activities on Et esters of various fatty acids. The enzyme cleaved all the ester bonds of triolein. The optimum pH values when olive oil and tributyrin were used as substrates were 7.5 and 10.0, resp. One fragment

derived from the enzyme cleaved off by cyanogen bromide had an N-terminal sequence of Asn-Gly-Ala-Ile-Lys-Arg-Leu-Ser-Ala-Asp-Val-Gln-Asp-Lys-Ile-Lys-Gly-Val- Val. Enzymic properties and amino acid sequences of the lipolytic enzyme (L1) from A. oryzae and **cutinases** from other **fungi** are compared and discussed.

L10 ANSWER 28 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN

1995:48425 Document No. 122:2349 Diversity of **cutinases** from plant pathogenic **fungi**: Cloning and characterization of a **cutinase** gene from Alternaria brassicicola. Yao, C.; Koller, W. (Department Plant Pathology, Cornell University, Geneva, NY, 14456, USA). Physiological and Molecular Plant Pathology, 44(2), 81-92 (English) 1994. CODEN: PMPPEZ. ISSN: 0885-5765.

AB Alternaria brassicicola produced two cutinase isoenzymes in the presence of cutin monomers as specific inducers. A cDNA library was constructed from poly(A)+RNA isolated from mycelium incubated with cutin monomers. Specific cDNA clones were selected from the library according to their abilities to hybridize with first strand cDNA prepared from induced cultures, but not from glucose-grown cultures. Cutinase-specific cDNA clones were identified by Southern anal. of plasmid DNA, employing a mixture of two heterologous cutinase cDNAs and one cutinase gene as probes. The largest 984 bp insert found among pos. clones contained the entire cutinase coding region composed of 209 amino acids. The amino acid sequence predicted from the cDNA nucleotide sequence contained amino acids and sequences highly conserved among fungal cutinases. The sequences of four addnl. pos. cDNAs were identical and thus gave no indication for the presence of a second gene of origin. Southern anal. of genomic DNA of A. brassicicola yielded a similar result. The structural gene of cutinase (CUTAB1) was contained within a 1545 bp genomic DNA fragment. Nucleotide sequences of the cDNA and the gene were identical, with the exception of one intron of 56 bp. The location of the intron was identical with introns identified in other fungal cutinase genes. The potential role of CUTAB1 in pathogenicity will be determined by gene disruption.

L10 ANSWER 29 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN

1994:317133 Document No. 120:317133 Identification of regulatory elements in the cutinase promoter from Fusarium solani f. sp. pisi (Nectria haematococca). Kamper, Jorg T.; Kamper, Ute; Rogers, Linda M.; Kolattukudy, Pappachan E. (Ohio State Biotechnol. Cent., Ohio State Univ., Columbus, OH, 43210, USA). Journal of Biological Chemistry, 269(12), 9195-204 (English) 1994. CODEN: JBCHA3. ISSN: 0021-9258.

AB The cutinase gene from Fusarium solani f. sp. pisi (Nectria haematococca) is induced upon contact with the plant cuticular polymer, cutin, by the unique hydroxy fatty acid monomers released by **cutinase** carried by virulent strains of the **fungus**, and this gene is also catabolite-repressed by glucose. Functional elements of the cutinase promoter were studied in vivo by transforming F. solani pisi with fusions of 5'-flanking regions of the cutinase gene and the gene encoding chloramphenicol acetyltransferase (cat). DNA-binding proteins from F. solani pisi were analyzed in vitro by gel shift expts., methylation interference anal., and UV-crosslinking expts. Four promoter elements involved in cutinase gene regulation were identified: a silencer, a pos.-acting G-rich element, an element that binds a basal transcription factor, and a palindrome necessary for induction by cutin monomer. A silencer between -287 and -249 keeps basal gene expression low but also influences the inducibility of the gene. To restore high levels of induction, a G-rich pos.-acting element with sequence similarities to other fungal elements acts as an antagonist to the silencer. Basal transcription is mediated by the first 141 base pairs of the cutinase promoter. The binding

site of transcription factor CTF2 was identified between the TATA box and the transcription initiation sites. Gene induction by cutin monomers is regulated by CTF1, most probably a dimeric DNA-binding protein of 49 kDa with a palindromic recognition site at -170.

L10 ANSWER 30 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1994:292611 Document No. 120:292611 Diversity of **cutinases** from plant pathogenic **fungi**: purification and characterization of two **cutinases** from Alternaria brassicicola. Trail, Frances; Koller, Wolfram (Dep. Plant Pathol., Cornell Univ., Geneva, NY, 14456, USA). Physiological and Molecular Plant Pathology, 42(3), 205-20 (English) 1993. CODEN: PMPPEZ. ISSN: 0885-5765.

AB Previous evidence indicated a relationship between the pH optima of fungal cutinases and the tissue specificities of the pathogens. Cutinases with slightly acidic pH optima were associated with leaf pathogens, whereas stem base pathogens produced cutinases most active under alkaline conditions. Alternaria brassicicola secreted both types of cutinases and caused disease on all above-ground host tissues. Two cutinases, Ac and Ba, which were expressed after growth of the pathogen on polymer cutin and in the presence of cutin monomers as cutinase inducers, were purified to apparent homogeneity. Cutinase Ac had a cutinolytic pH optimum of 6.5 and cutinase Ba had a cutinolytic pH optimum of 8.5. Their mol. wts. were 23.0 kDa and 21.0 kDa, resp. Other enzymic and structural parameters were similar for both enzymes. The V- and Km-values for p-nitrophenyl esters with acyl chains ranging from C4 to C16 decreased for both enzymes with increasing chain length. The esterase inhibitors ebelactones A and B were equally active competitive inhibitors of both cutinases. Amino acid compns. were similar but not identical, and the separation pattern of tryptic peptides indicated structural differences between the two isoenzymes. Although the cutinases could be distinguished by their pH dependency of cutinolytic activities and their size, the similarities indicate a close evolutionary relationship.

L10 ANSWER 39 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1991:674186 Document No. 115:274186 Cloning, expression and characterization of cutinase, a fungal lipolytic enzyme. Lauwereys, M.; De Geus, P.; De Meutter, J.; Stanssens, P.; Matthyssens, G. (Plant Genet. Syst. N. V., Ghent, B-9000, Belg.). GBF Monographs, 16(Lipases), 243-51 (English) 1991. CODEN: GBMOEB. ISSN: 0930-4320.

AB A **cutinase** from the **fungus** Fusarium solani pisi has been overproduced in E. coli by placing a phoA-signal/cutinase hybrid gene under the control of the tac promoter. Due to its periplasmic location the recombinant enzyme can be easily purified in large quantities. Assays using p-nitrophenylbutyrate suggest that the overproduced and authentic enzyme are catalytically equivalent The specific activities on tributyrin (4000u/mg) and triolein (800u/mg) demonstrates the lipolytic nature of the enzyme. The cutinase, however, differs from classical lipases in that no measurable activation around the CMC of the tributyrin substrate is observed The recombinant enzyme is quite thermostable.

L10 ANSWER 50 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1984:525564 Document No. 101:125564 **Cutinases** from **fungi** and pollen. Kolattukudy, P. E. (Inst. Biol. Chem., Washington State Univ., Pullman, WA, 99164, USA). Lipases, 471-504. Editor(s): Borgstroem, Bengt; Brockman, Howard L. Elsevier: Amsterdam, Neth. (English) 1984. CODEN: 52BFAV.

AB The biosynthesis, purification, properties, and function of **cutinases** of **fungi** and pollen are discussed, most of the information being on the fungal

cutinases. The catalytic mechanism of the fungal cutinases and the effect of surfactants on them are included in the discussion.

L10 ANSWER 51 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1983:501527 Document No. 99:101527 Primary structure of the active site region of fungal cutinase, an enzyme involved in phytopathogenesis. Soliday, C. L.; Kolattukudy, P. E. (Inst. Biol. Chem., Washington State Univ., Pullman, WA, 99164, USA). Biochemical and Biophysical Research Communications, 114(3), 1017-22 (English) 1983. CODEN: BBRCA9. ISSN: 0006-291X.

AB Cutinase, a fungal extracellular enzyme involved in phytopathogenesis, was labeled by treatment with [3H]diisopropylfluorophosphate and by reduction of the only SS with dithioerythritol followed by treatment with iodo[1-14C]acetamide. A tryptic peptide containing both the active serine and 1 of the cysteines involved in the SS bridge was isolated and the primary structure was determined This active site has very little homol. with the active serine-containing regions of other enzymes.

L10 ANSWER 52 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1981:527989 Document No. 95:127989 **Cutinases** from **fungi** and pollen. Kolattukudy, P. E.; Purdy, R. E.; Maiti, I. B. (Inst. Biol. Chem., Washington State Univ., Pullman, WA, 99164, USA). Methods in Enzymology, 71(Lipids, Pt. C), 652-64 (English) 1981. CODEN: MENZAU. ISSN: 0076-6879.

AB A review with 17 refs. Procedures for the assay and purification of **cutinases** from **fungi** and pollen are described. The properties of these enzymes are also summarized.

L10 ANSWER 53 OF 55 CAPLUS COPYRIGHT 2004 ACS on STN
1980:545270 Document No. 93:145270 Isolation and characterization of a cuticular polyester (cutin) hydrolyzing enzyme from phytopathogenic fungi. Lin, T. S.; Kolattukudy, P. E. (Dep. Agric. Chem., Washington State Univ., Pullman, WA, 99164, USA). Physiological Plant Pathology, 17(1), 1-15, 2 plates (English) 1980. CODEN: PPPYBC. ISSN: 0048-4059.

AB Cutinase, an extracellular enzyme which catalyzes the hydrolysis of the structural component (cutin) of plant cuticle, was isolated in electrophoretically homogeneous form from 5 phytopathogenic fungi, Fusarium roseum culmorum, F. roseum sambucinum, Ulocladium consortiale, Streptomyces scabies, and Helminthosporium sativum. The mol. wts. of these enzymes were .apprx.25,000. The enzymes from Fusarium species and that from U. consortiale contained 2 fragments which may originate by a proteolytic nick at about the middle of the parent polypeptide. Amino acid compns. of the enzyme from all of the fungi were quite similar and contained 3.5-6% carbohydrate. None of these enzymes cross-reacted with the antibody prepared against cutinase I from F. solani pisi although the enzyme from F. roseum sambucinum was inhibited 25% by this antibody. Alkaline NaB3H4 treatment and analyses of products showed that all proteins except those from S. scabies and H. sativum incorporated 5.5-6.5 g atom of 3H/mol of the enzyme, showing that it contained O-glycosidically attached carbohydrate. Those enzymes which incorporated 3H into the polypeptide also gave labeled carbohydrates and chromatog. identification of the reduced sugars showed that the O-glycosidically attached sugars were mannose, an unidentified neutral sugar, glucosamine, and glucuronic acid. Identification of the labeled amino acids in the hydrolyzates of the labeled peptides showed that the following amino acids were involved in the O-glycosidic linkages: serine, threonine, and β- hydroxyphenylalanine in U. consortiale; serine and β- hydroxyphenylalanine in F. roseum culmorum; serine in F. roseum sambucinum.